trustworthy meters would be considerable; also the average electricity meter is very unsightly. A new submeter which overcomes a great many of the objections of the existing meters is, however, now obtainable, and should help largely towards the development of the small power load. The meter is of the mercury-electrolytic type, and has been proved to be very accurate; it fits over the ordinary two-pin wall plug. It is an inexpensive matter to fix this meter in several rooms wherever a consumer may wish to employ a heating appliance, and he is able to read the meter without trouble and know exactly what his radiator or kettle—as the case may be—is costing him.

UNDER the title "Probleme der katalytischen Forschung" (Leipzig: Veit and Co., price 1.20 marks) Dr. Gertrud Woker has published in pamphlet form an inaugural address delivered at the University of Bern. A suggestive review is given of such questions as the nature of the catalytic changes occurring in the oxidation of sulphur dioxide by nitrous fumes in the chamber process of making sulphuric acid, the problems of autoxidation, the action of the so-called oxydases within the organism, and the nature of the transformations brought about by enzymes in general; finally, the relationship between toxins and anti-toxins is discussed as a phenomenon of physical chemistry governed by the law of mass action.

THE first meeting of the new session of the Entomological Society of London will be held on Wednesday next, October 2, when a paper will be read on the butterflies of Mauritius and Bourbon by Lieut.-Colonel N. Manders.

WE have received from Messrs. F. Darton and Co. their illustrated price list of standard meteorological and other instruments. Some useful notes are given for the benefit of students and others, together with a list of text-books recommended; the latter might be revised with advantage. Before establishing new stations, observers would do well to consult recognised meteorological authorities, especially as regards the installation and proper exposure of the instruments.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN OCTOBER:—

Oct. 1. 18h. Jupiter in conjunction with the Moon. (Jupiter 1° 11′ S.).
2. 12h. 58m. Minimum of Algol (β Persei).
4. Saturn apparently without rings.
5. 9h. 47m. Minimum of Algol (β Persei).
8. 6h. 36m. Minimum of Algol (β Persei).
14. 17h. Mars in conjunction with the Moon. (Mars 1° 47′ S.).
18. 6h. Saturn in conjunction with the Moon. (Saturn 2° 13′ N.).
18–22. Epoch of October meteors. (Radiant 92°+15°.)
22. 22h. Mercury at greatest elongation, 24° 20′ E.
26. 19h. Venus in conjunction with α Libræ. (Star 0° 5′ S.).
28. 8h. 18m. Minimum of Algol (β Persei).
29. 9h. Jupiter in conjunction with the moon. (Jupiter 1° 41′ S.).

SPECTRUM OF DANIEL'S COMET (1907*d*).—Photographs of the spectrum of comet 1907*d*, taken with a Zeiss prismatic camera, were obtained by Herr H. Rosenberg at the Göttingen Observatory on August 9, 11, and 14, with exposures of twenty-five, twenty-eight, and eighteen minutes respectively. The results of the measurements of the spectrograms are uncertain to about ±10 Ångström units, but certainly show that the spectrum includes the chief hydrocarbon and cyanogen bands, with a continuous spectrum extending from about 505 μμ to 370 μμ. The brightest bands are those coinciding with the two heads of the third cyanogen band at λλ 3883 and 3872 respectively; the third strongest band of the seven measured coincides with the fourth carbon band at λ 4737. Two bands at λλ 4055 and 4035 are as yet unidentified. The photograph of August 9 showed bands at 473, 438, 423, 404, and 388 μμ in the spectrum of the comet's tail, all of which were apparently of equal length and strength.

A continuation of the ephemeris of this comet, computed by Herr J. Franz from Dybeck's elements, appears in the same journal (*Astronomische Nachrichten*, No. 4200, p. 401, September 12); the following is abstracted therefrom:—

Ephemeris 12*h*. (*M.T. Berlin*).

1907	α (true) h. m.	δ (true) ° ′	log *r*	log Δ	Brightness
Sept. 25	11 4·8	+5 47·1	9·8550	0·2085	4·89
29	11 21·9	+4 32·1			
Oct. 3	11 37·7	+3 20·7	9·9264	0·2453	3·00

THE LOWELL EXPEDITION TO THE ANDES.—A second communication from Prof. David Todd to Dr. W. J. S. Lockyer gives additional information concerning the work of the Lowell expedition, of which Prof. Todd is in charge. It appears that at the chief station of the expedition, Alianza, more than 7000 photographs of Mars were obtained during the period June 17 to August 1. Prof. Lowell's discussion of these will form a most important addition to areography, as they show, covering a complete round of the planet, the changing appearances of the two polar caps, a multitude of "oases," and hundreds of the "canals," many of which are plainly in the geminate form.

The photographed images of the planet, as enlarged by the Gaertner camera, are of about three-sixteenths of an inch diameter, and will admit of much further enlargement. Exposures of about two seconds were given on Seed and Cramer plates.

SEPTEMBER METEORS.—The appearance of several bright meteors during the present month is reported from various quarters, but no details of the paths are given. One very fine one was seen at South Kensington by Mr. H. E. Goodson at 11h. 40m. on September 9. The meteor itself disappeared behind a house-top, but left a splendid trail which persisted for fully one-quarter of a minute. Judging from this trail, the direction of the meteor's flight was along a line from β Ursæ Minoris, passing half-way between θ and ι Draconis. The meteor was very brilliant and swift, and was followed almost immediately by a less bright one, which pursued nearly the same path.

PHOTOGRAPHS OF PHŒBE.—Using the 30-inch reflector of the Greenwich Observatory, Mr. Melotte has obtained a series of photographs of Phœbe, Saturn's ninth satellite. The results derived from provisional measurements of the plates show that Dr. Ross's ephemeris, published in the second edition of the American Ephemeris for 1907, is essentially correct (the *Observatory*, No. 387, p. 366, September).

SOLAR ACTIVITY AND TERRESTRIAL PHENOMENA.—We have received from MM. Cirera and Balcells, of the Tortosa Observatory, Spain, a discussion of the relations observed to exist between the variations of solar activity and of terrestrial magnetism and electricity during the first three months of this year.

From this discussion the observers arrive at the following conclusions:—(1) the solar activity increased in January, passed a maximum in February, and decreased during March; (2) the regions of activity exhibited motions in the opposite direction to the sun's rotation; (3) the variations of activity often commenced in the chromosphere. Regarding the correlation of these variations with magnetic and electrical perturbations, the following conclusions were arrived at:—the perturbations either coincided with the appearance of a region of activity on the eastern limb of the sun, with the passage of such a region over the sun's central meridian, or with an extraordinary increase of activity near to the central meridian.

On March 22 an observed strong perturbation coincided, in time, with the central-meridian passage of a region which had been active during the previous rotation of the sun, and on certain dates in January and February the

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perturbations were more intense on the meridian passage of a region which, having been active before, was increasing in activity.

Three excellent drawings of the great January to April (1905) sun-spot made by Prof. Mascari are reproduced in No. 7, vol. xxxvi., of the *Memorie della Società degli Spettroscopisti Italiani*.

THE JUVISY OBSERVATORY.—An interesting description, illustrated with photographs, of the Juvisy Observatory appears in the August and September issues of the *Bulletin de la Société astronomique de France*. The observatory was founded in 1883 by M. Flammarion, and is principally engaged on planetary observations.

BOTANY AT THE BRITISH ASSOCIATION.

THE time of Section K was considerably occupied in joint meetings with other sections. Thus there was a joint discussion with Section D on "The Physical Basis of Heredity," of which an account will be found in "Zoology at the British Association" (NATURE, September 19, p. 530), and another with Sections D and L on "The Teaching of Biology in Schools," which is described in "Education at the British Association" (NATURE, September 12, p. 505).

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A third joint meeting was held, with Sections C, D, and E, to hear an address by Prof. Conwentz, the Prussian State Commissioner for "Naturdenkmalpflege," on "The Preservation of Natural Monuments." Prof. Conwentz explained that the phrase "natural monuments" was new in Germany as well as in England, but we should recognise that there could be monuments of nature as well as of art. The constant inroads of cultivation and of industrial undertakings have led, and are leading, especially in countries with crowded populations, to the disappearance of scientifically interesting and even unique natural objects and types of scenery. A widespread feeling has arisen that as much as possible should be done to prevent such destruction, and this has recently led, not only to much local effort directed towards this end, but in Prussia to the institution of a special State department under the Minister of Education for the purpose of directing and coordinating such efforts. This department (of which the lecturer is the head) has no funds allotted to it for the actual purchase of land bearing natural monuments, nor is it considered that purchase is the right procedure except in special cases. The aim is rather to get private owners interested in the natural monuments on their property, and to induce them to be responsible for their safeguarding and preservation. In the case of Government land, the Forestry Department cooperates by making regulations prohibiting the felling of unique trees, the total clearance of particular types of woodland, &c. Prof. Conwentz's department is prepared to initiate all effort of this kind in Prussia. Its activity has already, during the single year of its existence, met with considerable success. Many areas of primitive marsh and water, heath and woodland, often containing rare and interesting characteristic species of animals and plants, have been saved from destruction, and arrangements made for their permanent preservation. The necessary work falls under three heads:—first, the cataloguing of the natural monuments of the country; secondly, the mapping and scientific description of such monuments; and thirdly, the undertaking of appropriate means for their preservation.

Prof. Conwentz directed attention to the numerous organisations in this country the work of which tends towards this general object, but pointed out that none of them have precisely the same ends in view as his Prussian department. He particularly mentioned the Commons Preservation Society, the Kyrle Society, the National Trust for the Preservation of Places of Historic Interest and Natural Beauty, and the Central Committee for the Survey and Study of British Vegetation. He suggested that the last-named organisation might add the preservation of British vegetation to its objects, and also that efforts in this direction might be helped by the British Association. He pointed out that love for and care of the characteristic natural scenery of the homeland was one aspect of true patriotism, and should act as a check on the purely materialistic development of modern civilisation. The lecture was illustrated by a beautiful series of lantern-slides showing types of protected scenery in Germany, and also of many British examples of a similar kind.

Discussion on the Cytology of Reproduction in the Higher Fungi.

This occupied most of Monday morning, August 5. Three papers were read, and were followed by a discussion.

In the first paper Miss Fraser and Miss Chambers described the development of the ascocarp in *Aspergillus* (*Eurotium*) *herbariorum*. The archicarp consists of a unicellular trichogyne, a unicellular ascogonium, and a septate stalk. An antheridium, divided into a stalk and antheridial cell, is present, and usually fuses with the trichogyne; both structures are cœnocytic. After normal fertilisation or its equivalent, the ascogonium becomes septate and produces ascogenous hyphæ. A sheath is developed, and finally asci are formed. In these, nuclear fusion takes place, and three divisions follow, giving rise to the nuclei of the eight spores.

The authors regarded the genus Aspergillus as primitive, and related its archicarp to that of other groups of Ascomycetes. They pointed out that the male organ closely resembles the antheridium of discomycetous forms; on the other hand, if the antheridial cell, instead of fusing with a neighbouring archicarp, were set free from its parent hypha, it would scarcely differ from the spermatium of the Pyrenomycetes. They held, with Wolfe, that a similar development had taken place among the Florideæ, and regarded the Ascomycetes as a monophyletic group.

Miss Welsford's paper dealt with fertilisation in *Ascobolus furfuraceus*. She confirmed Harper's statement that the archicarp, or scolecite, originates as a row of uninucleate cells. These subsequently become multinucleate, and one increases in size and gives rise to ascogenous hyphæ. Nuclei migrate into this cell and undergo fusion before passing into its branches. Miss Welsford regarded this process as a form of reduced fertilisation, and suggested two interpretations—either (1) the scolecite is a multicellular female organ and the fusions are those of female nuclei in pairs, or (2) the ascogenous cell only is female, the other cells of the scolecite being vegetative and representing a functionless trichogyne and stalk; in this case fertilisation probably consists of the union of a female and a vegetative nucleus.

In the third paper Miss Fraser gave an account of the cytology of *Humaria rutilans*. In this species sexual organs are not developed, but a reduced form of fertilisation obtains, the nuclei of the vegetative mycelium fusing in pairs. Asci are developed from hyphæ which contain fusion nuclei; these show sixteen chromosomes, the sporophytic number, in their mitoses. In each ascus three nuclear divisions take place; the first is heterotype, the chromosomes dividing *transversely*, and the second homotype. These bring about a reduction, related here, as in all other investigated organisms, to normal or reduced fertilisation. During the prophases of the heterotype division, a second nuclear fusion occurs; Miss Fraser suggested a mechanical explanation for this process, and showed that it was occasionally omitted. The sixteen chromosomes which are present throughout the meiotic phase represented the reduced number for two nuclei. The fusion in the ascus is compensated by a peculiar process of reduction taking place in the third division, and termed by Miss Fraser *brachymeiosis*. Sixteen chromosomes are formed from the spireme, and eight pass *without fission* to each daughter nucleus. The reduced number for one nucleus thus appears.

The author considered that this process probably occurred in connection with other asexual fusions also. She related her observations on *Humaria rutilans* to the facts described for Phyllactinia (Harper, 1905) and other Ascomycetes. In conclusion, she pointed out the close analogy between the two fusions in the life-history of Humaria, and suggested that the type of compensating reduction (whether meiotic or brachymeiotic) might be usefully employed to differentiate between sexual and asexual fusions.

The discussion was opened by Prof. Farmer, who agreed

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